ME 354 Homework #5 Due: March 7th, 2008 before class.

1) Hot-rolled and normalized AISI 1045 Steel can be assumed to have an *S-N* curve of the form of Eq. 9.6. (a) Use the test data in Table P9.4 to obtain values for *A* and *B* using a linear-least squares approach for log N_f vs. log σ_a. (b) Plot the data in Table P9.4 on a log-linear graph similar to Figure 9.4 and add to the graph the curve for Eq 9.6 which the values for *A* and *B* that you previously found. (c) What are the safety factors in stress and in life for a designed service of 300 MPa and 1500 cycles?

2) Dowling, Problem 9.42. Estimate number of repetitions necessary to cause fatigue failure using (a) SWT equation, (b) Morrow equation, and (c) Walker equation with γ = 0.65.

Suggested problems:

Problems: 9.12-15
9.19
9.25 N_f = 1.9e5, 6.4e4, 5.3e5
9.26 N_f = 1.9e5, 4.0e4, 1.9e6
9.27 N_f = 1.9e5, 6.5e4, 9.6e5
9.35 X_N= 1422 X_S= 1.739
9.37(a) X_N= 29.40
9.43 B_f = 124,000 (SWT)
9.45 B_f = 21,200 (SWT) B_f = 3,517 (Morrow)
9.46 B_f = 742 (SWT) B_f = 1,775(Morrow)
9.47 B_f = 53,271 (SWT) B_f = 101,1400 (Morrow)